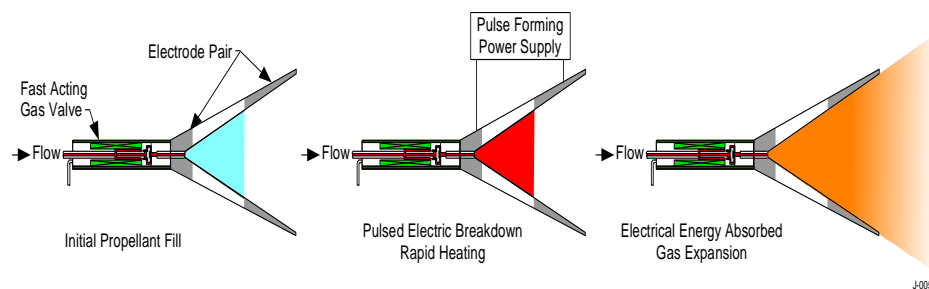


PI: Takashi Nakamura, Physical Sciences Inc., Andover, MA

Identification and Significance of Innovation: A new pulsed electric thruster, the “Pulsed ElectroGasdynamic (PEG) thruster,” was developed and operated successfully for performance evaluation. In this thruster the propellant gas is accelerated gasdynamically by an innovative use of pulsed electric power. The PEG thruster generated impulse at ~ 0.1 mN-s/pulse with the specific impulse (Isp) ranging 500 ~2000 sec. The propellant utilization of the test thruster was low, typically 20%. Design configuration to improve the propellant utilization to $\sim 80\%$ was identified. The electrical efficiency achieved by the test thruster was low ($\sim 10\%$) due to non-optimized power input. We identified properly optimized power input method which will achieve a higher electrical efficiency range 50 ~ 60%. Conceptual design of the PEG thruster for CubeSats and small satellites.



Expected TRL Range at the end of Contract (1-9): 4

Technical Objectives and Work Plan: The overall technical objective of the Phase II program is to evaluate the performance of the Pulsed ElectroGasdynamic thruster through a focused laboratory study. In the Phase I program we demonstrated the feasibility of the Pulsed ElectroGasdynamic (PEG) thruster as a compact, light weight thruster with $I_{sp} = 700 \sim 1200$ sec. In the Phase II program we developed the engineering development unit (EDU) for more detailed performance characterization.

This Phase II work had the following tasks:

1. Build the engineering development unit (EDU) of the Pulsed ElectroGasdynamic (PEG) thruster;
2. Test the EDU thruster under simulated space environment for performance characterization;
3. Develop conceptual designs of the PEG thruster for small satellites to identify optimum design configurations and evaluate performance, weight and operational issues.

NASA and Non-NASA Applications

Satellite mobility
Satellite orbit transfer
Station keeping
Attitude control
Controlled constellation formation flight

Firm Contacts

Dr. Takashi Nakamura, 925-743-1110, nakamura@psicorp.com;
Physical Sciences Inc., 20 New England Business Center,
Andover, MA 01810-1077